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Electron Yield of a Carbon-Composite Nanodielectric

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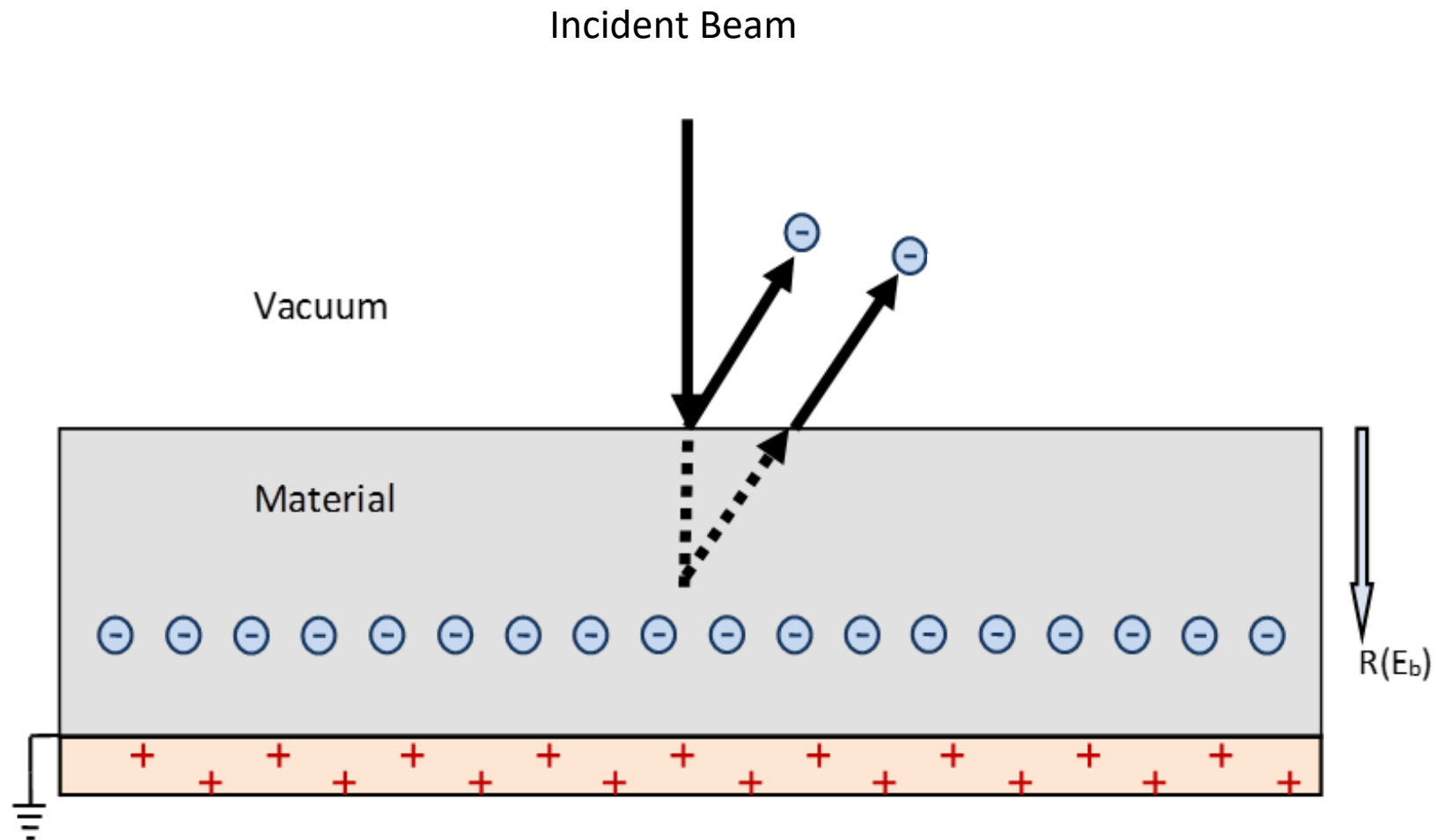
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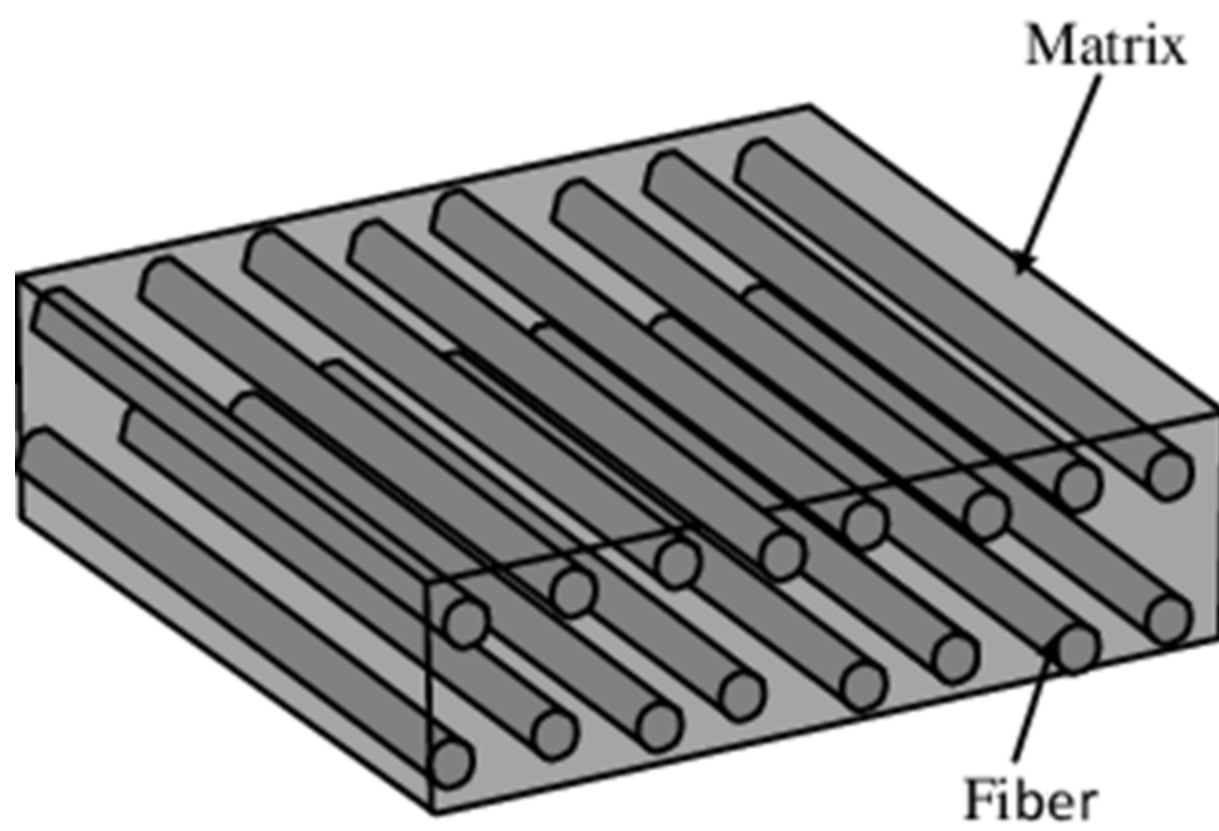
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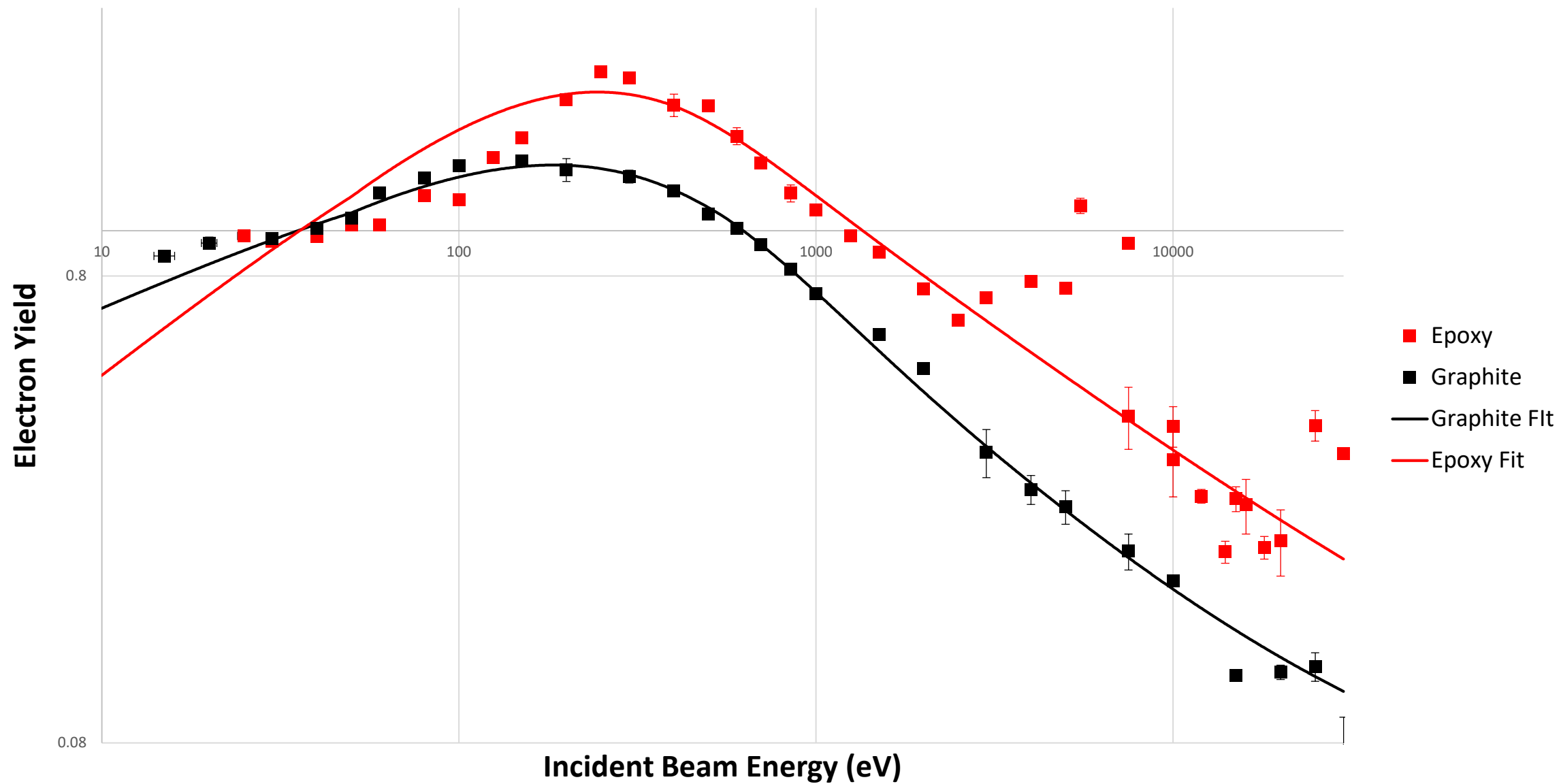
Electron Yield of a Carbon-composite Nanodielectric

Electron Yield

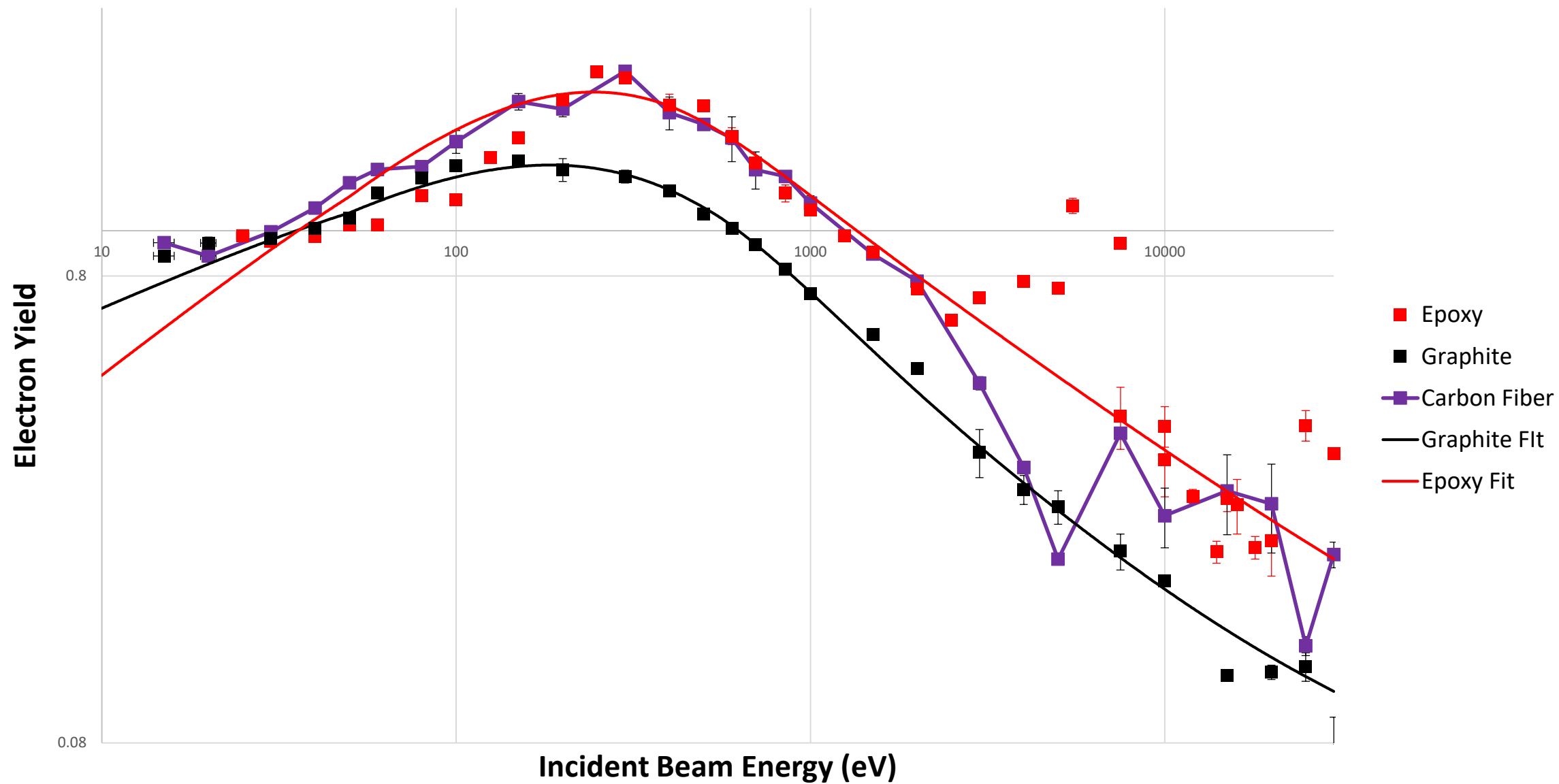




Comparison of Electron Yields



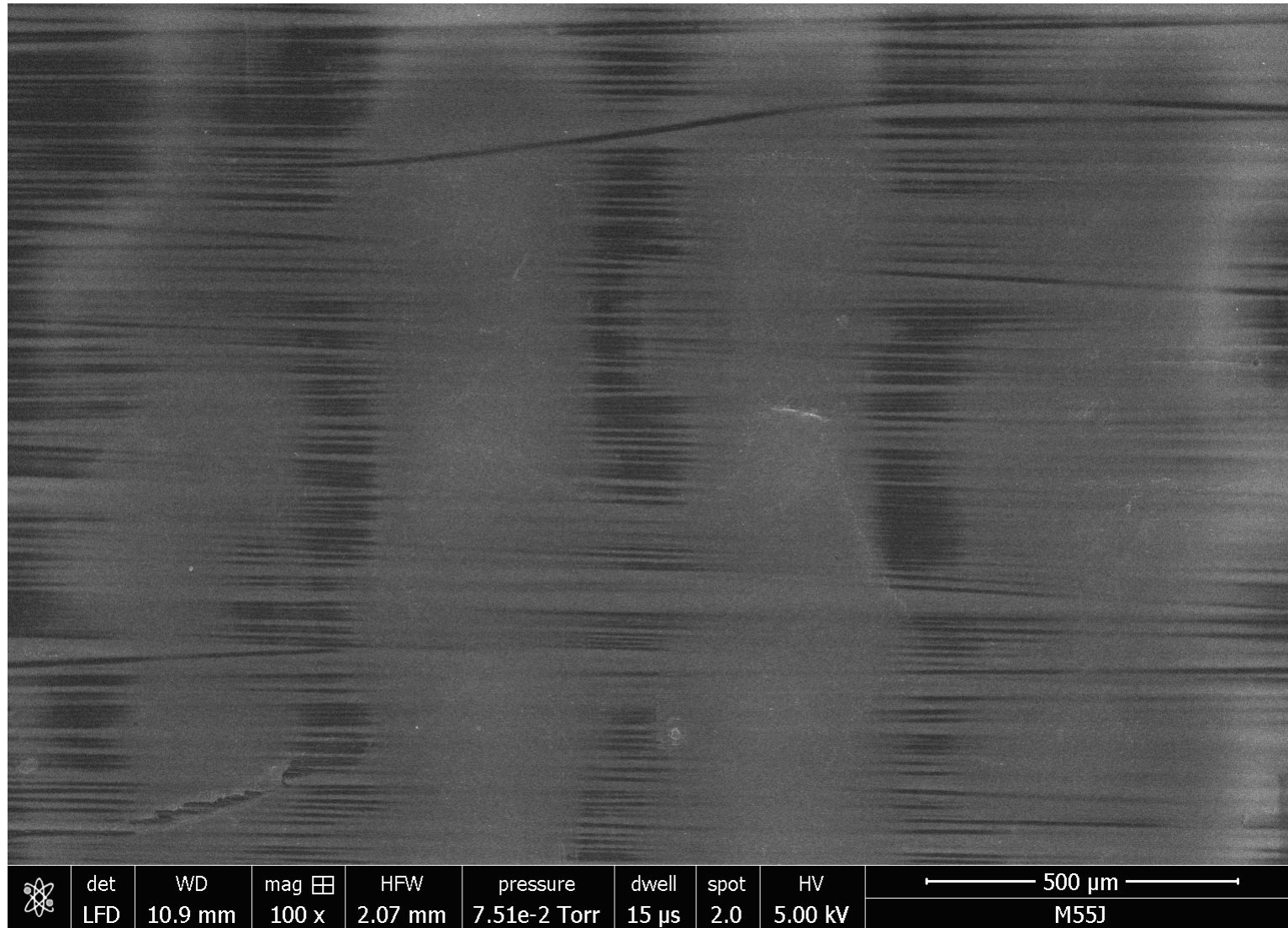
Comparison of Electron Yields



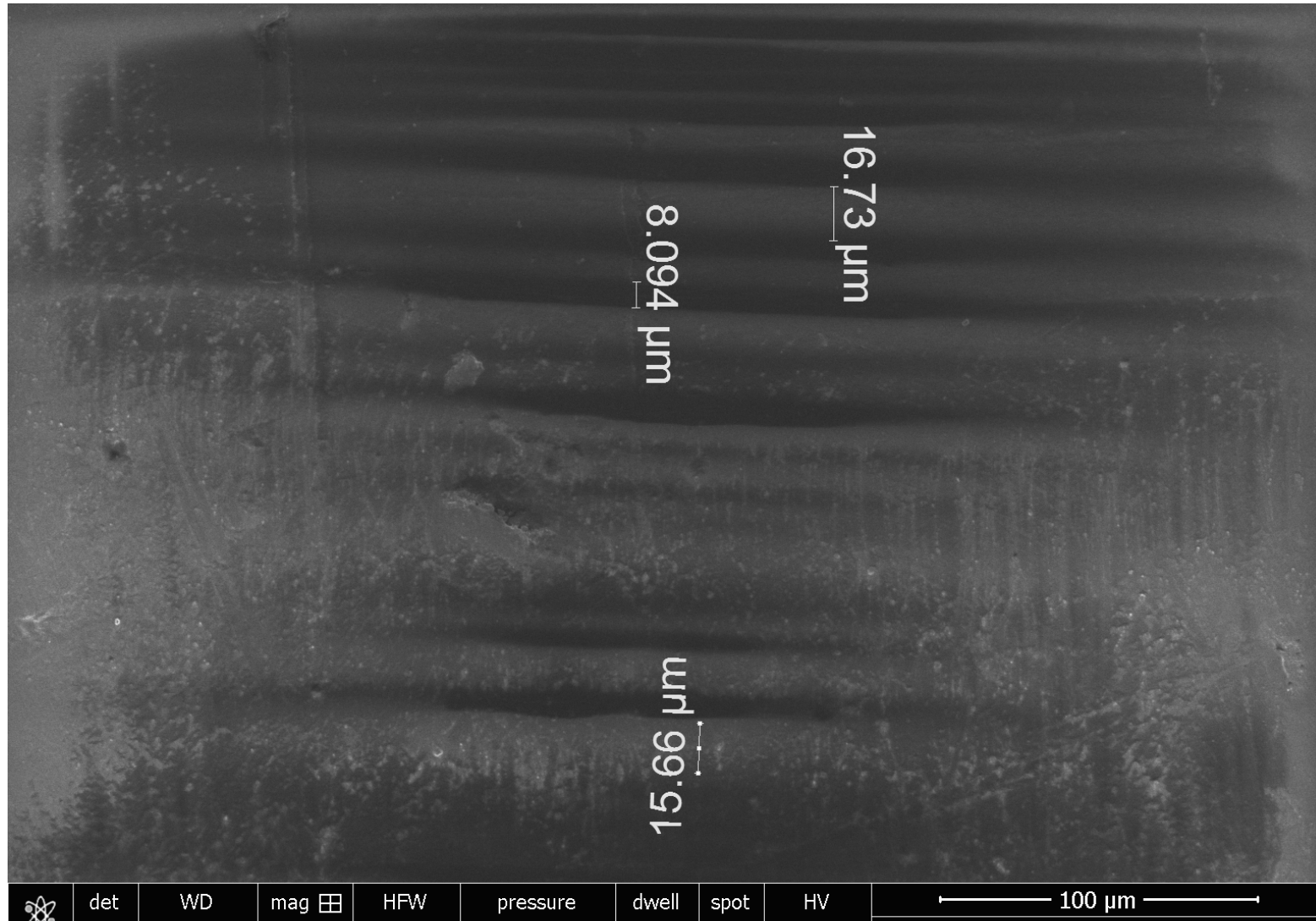
Conclusion

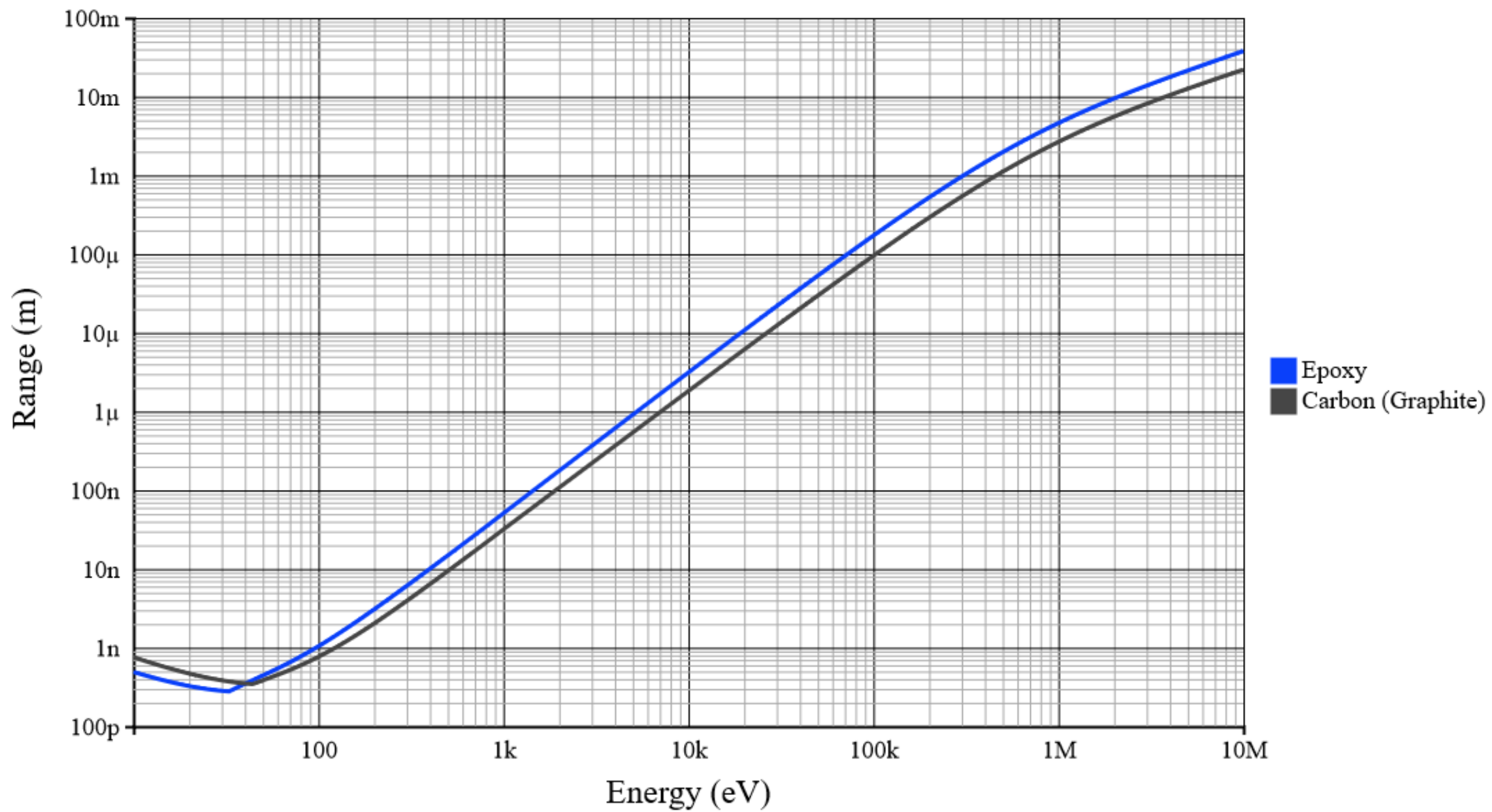
- Nano Scale structures and Geometry influence the Electron Yield
- The insulating Component (the Epoxy matrix) causes charging
- Our understanding of the individual components help us understand composite material Yield graphs

SEM



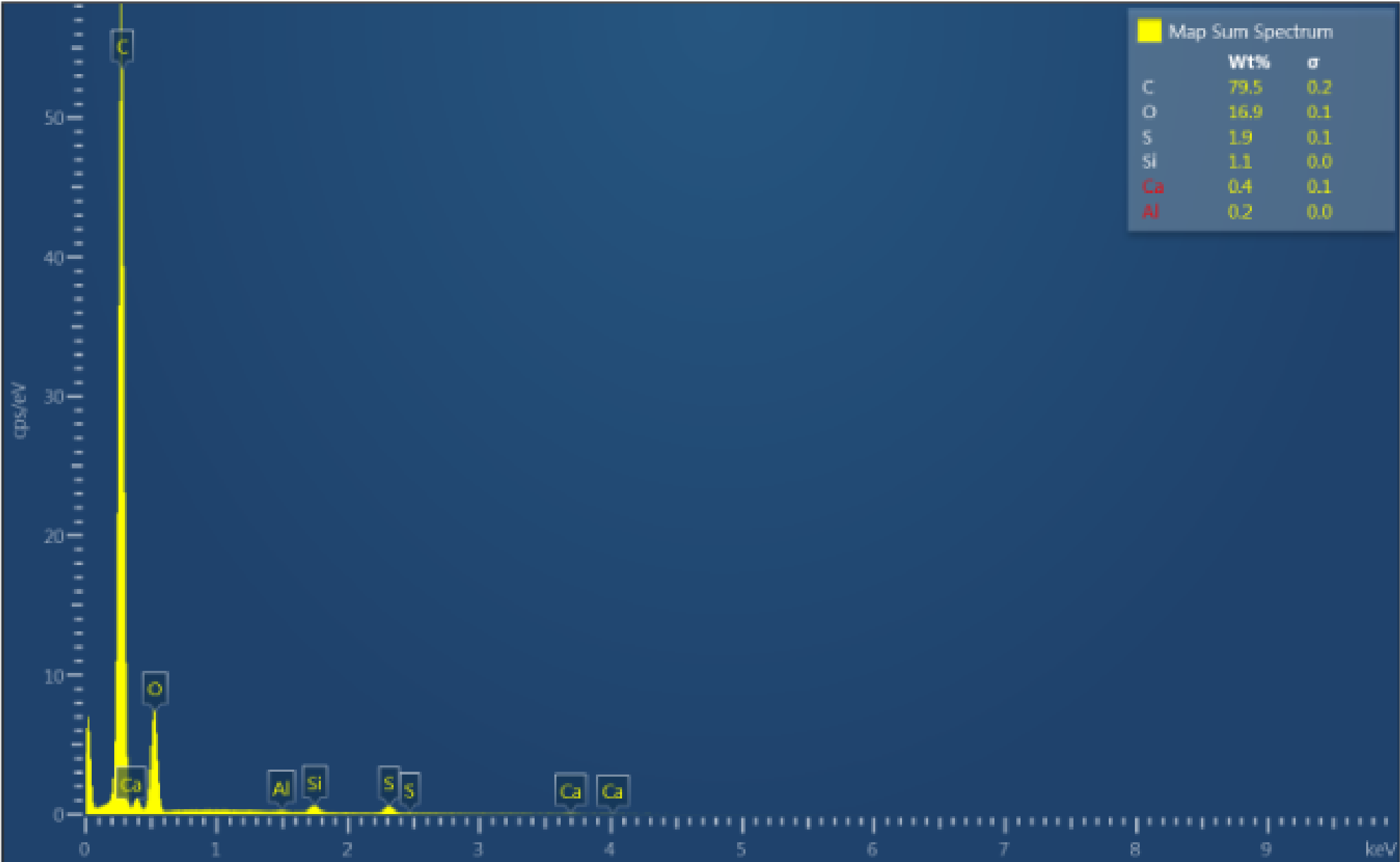
SEM Continued





Yield Features

		M55J	Epoxy
TEY	σ_{Max}	2.5 \pm 0.2	2.2 \pm 0.3
	E_{max}	230 \pm 80	256 \pm 50
	E_1	47 \pm 1	45 \pm 3
	E_2	960 \pm 400	1158 \pm 200



FUNCTIONAL PROPERTIES

CTE	-1.1 α·10 ⁻⁶ /°C
Specific Heat	0.17 Cal/g·°C
Thermal Conductivity	0.372 Cal/cm·s·°C
Electric Resistivity	0.8 x 10 ⁻³ Ω·cm
Chemical Composition: Carbon	>99 %
Na + K	<50 ppm

COMPOSITE PROPERTIES *

Tensile Strength	290 ksi	2,010 MPa	ASTM D-3039
Tensile Modulus	49.0 Msi	340 GPa	ASTM D-3039
Tensile Strain	0.6 %	0.6 %	ASTM D-3039
Compressive Strength	130 ksi	880 MPa	ASTM D-695
Flexural Strength	180 ksi	1,230 MPa	ASTM D-790
Flexural Modulus	40.5 Msi	280 GPa	ASTM D-790
ILSS	10.0 ksi	7 kgf/mm ²	ASTM D-2344
90° Tensile Strength	5.0 ksi	34 MPa	ASTM D-3039

* Toray 250°F Epoxy Resin. Normalized to 60% fiber volume.

FIBER PROPERTIES

		English	Metric	Test
Tensile Strength		583 ksi	4,020 MPa	TY-0
Tensile Modulus		78.2 Msi	540 GPa	TY-0
Strain		0.8 %	0.8 %	TY-0
Density		0.069 lbs/in ³	1.91 g/cm ³	TY-0
Filament Diameter		2.0E-04 in.	5 μm	
Yield	6K	6,833 ft/lbs	218 g/1000m	TY-0
Sizing Type & Amount	50B		1.0 %	TY-0
	Twist	Untwisted		